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Evaluation of clinical characteristics of children with cat allergy

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Abstract

Aim: In allergic diseases, identification of the responsible allergens and determination of the clinical features of the patients are important in terms of controlling the symptoms. In this study, we aimed to evaluate the clinical characteristics of children with cat allergy.

Material and Methods: The study is a descriptive type study with a retrospective design. The clinical features of children with cat allergy who visited our Pediatric Allergy and Immunology outpatient clinic between June 2022 and June 2023 were retrospectively evaluated based on patient files. All patients aged 0-18 years who were diagnosed with cat allergy in our clinic within a one-year period were included. Gender, age, diagnosis of allergic diseases, total IgE, eosinophil values were evaluated.

Results: Of the children with cat allergy, 38.1% (n=40) had cats at home. 70.5% (n=74) of the children with cat allergy also had house dust allergy. Total IgE values were significantly higher in children who did not have cats at home compared to those who had cats at home (p=0.008). Eosinophil values were statistically similar in both groups (p>0.05). Respiratory allergies were observed in 57.5% of those who had a cat at home, whereas respiratory allergies were observed in 67.2% (n=21) of those who did not have a cat at home (p=0.318).

Discussion: Cat allergy should be evaluated by detailed history and physical examination. It should be kept in mind that children may be at high risk of developing cat allergy even if there is no cat at home.

Keywords

Cat Allergy, Children, Pet

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Introduction

Today, the prevalence of allergic diseases is increasing [1]. One recent population-based study reported that approximately 26.4% of American children aged 0-17 years had one or more allergies [2]. In another study, the change in aeroallergen sensitization prevalence in Northern Sweden was examined in a highly representative study among school-aged children. In the same study, the prevalence of any positive skin prick test was 21% in 1996 and increased to 30% in 2017 [3].

Environmental factors are thought to be effective in the occurrence of allergic diseases in addition to genetic factors [4]. Environmental exposures at an early age cause the development of childhood allergic diseases [5]. Environmental pollutants, microorganisms, allergens, cigarette smoke and chemicals constitute a specific external environment to which individuals may be exposed throughout their lifetime [4, 6]. Aeroallergens are the most frequently identified allergens in patients diagnosed with allergies. In one study, it was reported that respiratory allergens were the most common allergens with a rate of 14.7%. In the same study, the frequencies of skin allergies and food allergies were reported as 12.7% and 6.4%, respectively [2]. The cat allergen is common among household allergens and may cause respiratory allergies and anaphylaxis in children [7]. The cat allergen responsible for allergic symptoms is frequently Fel d 1. Although cat allergy is especially common in populations where pets are common, cat allergy can be observed even in people who do not have cats at home. In a study conducted on atopic children in Turkey, the prevalence of cat allergy was found to be 31.2% [8]. According to another study, 13.4% of the patients with cat allergy had contact with a cat but they are not cat owners [9].

In allergic diseases, the identification of the responsible allergens and determination of the clinical features of the patients are important in terms of controlling the symptoms. This study aims to evaluate the clinical features of children who have a diagnosis of cat allergy.

Material and Methods

The study is a descriptive type study with a retrospective design. The clinical features of children with cat allergy who visited our Pediatric Allergy and Immunology outpatient clinic between June 2022 and June 2023 were retrospectively evaluated from patient files. All patients aged 0-18 years who were diagnosed with cat allergy in our clinic within a one-year period were included in the study.

Measures

Gender, age, diagnosis of allergic diseases (urticaria, asthma, allergic rhinitis, etc.), total IgE, eosinophil values were investigated. Cat allergy was diagnosed with a positive skin test or cat-specific IgE test in patients whose clinical presentation and history were compatible with cat allergy. Skin test positivity was defined as a reaction three mms or above the negative control. Specific IgE positivity was defined as an IgE value ≥0.35 kIU/l [10].

Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows 25.0 program was used for statistical analysis and data recording. Descriptive data were presented with median, minimum and maximum values, number (n) and percentages (%). The Mann-Whitney U test was used to compare the median values of two independent groups in non-normally distributed variables. The Chi- square test was used for the comparison of the categorical data. $p<0.05$ was the statistical significance level.

Ethics

Ethics committee approval was obtained from the Ethics Committee of the relevant hospital on 2023-08-10 with decision No: 278. Since the study is in a retrospective design, no informed consent was obtained.

Results

A total of 105 patients with cat allergy were evaluated in this study. The median age was 7.0 years (1.0-17.0). Of the patients 51.4% (n=54) were female and 48.6% (n=51) were male.

Of the children with cat allergy, 38.1% (n=40) had cats at home. Of those, 87.5% (n=35) had a cat at home before and after birth. 70.5% (n=74) of the children with cat allergy also had house dust allergy. The percentages of children with pollen and food allergy were 9.5% (n=10) and 3.8% (n=4), respectively. Allergic rhinitis was present in 34.3% (n=36), asthma and allergic rhinitis in 21.0% (n=22), and atopic dermatitis in 29.5% (n=31) (Table 1).

Table 1. Cat owners and allergic diagnosis of the patients

		n	%
Cat owners at home currently		40	38.1
Before and after birth		35	87.5
After birth		5	33.3
Cat owners before birth		2	1.9
House dust mite allergy		74	70.5
Pollen allergy		10	9.5
Food allergy		4	3.8
Allergic diagnosis	Asthma	8	7.6
	AR	36	34.3
	Asthma+AR	22	21.0
	AD	31	29.5
	Urticaria	7	6.7
	Anaphylaxis	1	1.0

AR: Allergic rhinitis, AD: Atopic dermatitis

Table 2. Laboratory values of the patients

	Median	Minimum	Maximum
WBC (10^3 mm^3)	8290.0	4400.0	16880.0
Neutrophil (10^3/uL)	3800.0	1700.0	38080.0
Eosinophil (10^3/uL)	410.0	40.0	1340.0
Eosinophil (%)	5.1	0.4	17.2
Lymphocyte (10^3/uL)	3100.0	1370.0	6170.0
Platelet (10^3 mm^3)	342500.0	150000.0	509000.0
Total IgE (IU/mL)	363.0	6.0	3370.0

Table 3. Eosinophil and total IgE values of cat owners and non-owners

	Presence of a cat at home		P value
	No (n=65) Median (min-max)	Yes (n=40) Median (min-max)	
Eosinophil (10^3/uL)	405.0 (4.0-1340.0)	420.0 (80.0-1040.0)	0.432
Eosinophil (%)	4.9 (0.4-17.2)	5.4 (0.4-13.3)	0.512
Total IgE (IU/mL)	480.0 (6.0-3370.0)	179.0 (6.0-1225.0)	0.008
	n (%)	n (%)	
Respiratory allergic diseases	43 (67.2)	23 (57.5)	0.318
Dermal allergic diseases	21 (32.8)	17 (42.5)	

When the laboratory values of the patients were evaluated, median values of white blood cell (WBC) and neutrophils were 8290.0 10^3mm^3 (4440.0 ve 16880.0) and 3800.0 103/uL (1700.0-38080.0), respectively. Absolute eosinophil and eosinophil (%) median values were 410.0 103/uL (40.0-1340.0) and 5.1% (0.4-17.2), respectively. The median values of lymphocytes, platelets and total IgE were 3100.0 103/uL (1370.0-6170.0), 342500.0 103mm3 (150000.0-509000.0), and total IgE 363.0 IU/mL (6.0-3370.0), respectively (Table 2).

Eosinophil and total IgE values of house dust-allergic children with and without cats at home were compared. Eosinophil values were statistically similar in both groups (p>0.05). Total IgE values were significantly higher in children who did not have cats at home compared to those who had cats at home (p=0.008). Children with asthma and allergic rhinitis were grouped as respiratory allergy patients, while those with urticaria and atopic dermatitis were grouped as dermal allergy patients. Respiratory allergies were observed in 57.5% of those who had a cat at home, whereas respiratory allergies were observed in 67.2% (n=21) of those who did not have a cat at home (p=0.318) (Table 3).

Discussion

The prevalence of allergic diseases shows an increasing pattern [11]. These diseases may decrease the quality of life and cause significant disease burden [12]. Evaluation of the conditions associated with the allergy clinic and patient characteristics is important for the control of allergic diseases. In this context, in our study, we evaluated the clinical characteristics of children with cat allergy and the presence or absence of a cat at home.

According to the results of our study, children with cat dander allergy were most likely to be allergic to house dust mite allergy. According to a study in the literature, 93.3% of children with cat allergy were also allergic to house dust mites [13]. Since house dust mites are one of the most common indoor allergens and indoor allergens are frequently exposed together, a high rate of house dust mite allergy in cat allergic patients is expected.

In our study, the most common allergic clinical diagnoses in children were allergic rhinitis, coexistence of allergic rhinitis and asthma and atopic dermatitis. Similarly, allergic rhinitis and asthma were the most common clinical diagnoses in cat allergic patients in a study in our country [14]. Since asthma and allergic rhinitis are among the most common chronic and allergic diseases in children [15], it is expected that these diagnoses were also seen frequently in children with cat allergy in our study.

According to the literature, although allergic reasons are frequently mentioned among the reasons why adult participants do not keep pets at home [16], it is known that cat allergy can also be observed frequently in those who do not have cats at home. In a study conducted in our country, cat allergy was reported with a rate of 13.9% in those who did not have a cat at home [17]. In a different study in the literature, it was reported that 35.0% of those with cat sensitization had a cat at home. Similarly, in our study, 38.1% of children with cat allergy had a cat at home [18]. Cat allergens are easily suspended in the air and can adhere to clothes. They can be found in public places such as schools and can remain in a household for up to 6 to 9 months even after the cat has left. Because of these characteristics, cat allergy can be seen frequently in those who do not have cats at home [19].

In our study, total IgE values were significantly higher in those who did not have cats at home. This emphasizes that cat allergens can also be exposed outside the home. Awareness of allergy and precautions taken may be less in those who do not keep cats at home. In future studies, the clinical severity of diseases such as asthma and allergic rhinitis in those with and without indoor contact may be compared. The percentage of respiratory allergic diseases was lower in those with a cat at home than in those without a cat at home, but statistical significance was not observed. Pet dander frequently causes respiratory symptoms in allergic patients [20]. Since exposure to aeroallergens such as cat allergy in children with atopic dermatitis may lead to respiratory allergic diseases in the context of atopic gait in the future, precautions should be taken regarding exposure in patients [21].

Limitation and Strengths

The fact that our study was conducted in a single center constitutes a limitation in terms of the generalizability of the results. The fact that the clinical severity of the patients could not be evaluated in the study is another limitation. Nevertheless, our study will make an important contribution to the literature by raising awareness on this issue, as it draws attention to the fact that cat allergy may be common in those who do not have cats at home.

Conclusion

According to the results of our study, children with cat allergy were most likely to be allergic to house dust mite allergy. The most common allergic clinical diagnoses in children were allergic rhinitis, coexistence of allergic rhinitis and asthma and atopic dermatitis. More than half of the children with cat allergy did not have a cat at home. Since cat allergy is common in the community, it should be kept in mind that children may be at high risk of developing cat allergy even if there is no cat at home. Cat allergy should be evaluated based on a detailed history and physical examination, and the diagnosis should be made by skin test and specific IgE in suspected cases.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of interest
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References
1. Platts-Mills TA. The allergy epidemics: 1870-2010. J Allergy Clinic Immunol. 2016; 136(1):3-13.
2. Pate CA, Zahran HS, Malilay J, Hsu J. The shifting prevalence of asthma and allergic disease in US children. Ann Allergy Asthma Immunol. 2022;129(4):481-9.
3. Ronmark E, Bunne J, Bjerg A, Perzanowski M, Winberg A, Andersson M, et al. Prevalence and risk factors for allergic sensitization: three cross-sectional studies among school-children from 1996 to 2017. J Allergy Clin Immunol. 2009;124(2):357-63, 63.e1-15.
4. Celebi Sozener Z, Ozdel Ozturk B, Cerci P, Turk M, Gorgulu Akin B, Akdis M, et al. Epithelial barrier hypothesis: effect of the external exposome on the microbiome and epithelial barriers in allergic disease. Allergy. 2022;77(5):1418-49.
5. Kapszewicz K, Podlecka D, Polańska K, Stelmach I, Majak P, Majkowska-Wojciechowska B, et al. Home environment in early-life and lifestyle factors associated with asthma and allergic diseases among inner-city children from the REPRO_PL birth cohort. Int J Environ Res Public Health. 2022;19(19):11884.
6. Cecchi L, D'Amato G, Annesi-Maesano I. External exposome and allergic respiratory and skin diseases. J Allergy Clin Immunol. 2018;141(3):846-57.
7. Kelly LA, Erwin EA, Platts-Mills TA. The indoor air and asthma: the role of cat allergens. Curr Opin Pulm Med. 2012;18(1):29-34.
8. Sayar EH. Aeroallergen Sensitivity of Atopic Children in Alanya Region. Selcuk Med J. 2020;36(3): 226-31.
9. Jensen-Jarolim E, Jensen SA, Bergmann K-C. Allergy to the cat—from diagnosis to management. Allergo J Int. 2023;32:130-7.
10. Ah, JY, Choi BS. Clinical evaluation of specific Immunoglobulin E in sputum in Pediatric Patients. Pediatr Allergy Immunol Pulmonol. 2018;31(2):73-7.
11. Ibodullaevna SF, Rustamovna KS, Gairatovna AD, Abdurakhmonovna SH. Prevalence and risk factors of allergic diseases in chidren in hot climatic conditions. Art of Medicine International Medical Scientific Journal. 2022;2(3):435-8.
12. Brough HA, Lanser BJ, Sindher SB, Teng JM, Leung DY, Venter C, et al. Early intervention and prevention of allergic diseases. Allergy. 2022;77(2):416-41.
13. Kulalert P, Sritipsukho P, Nanthapisal S, Poachanukoon O. Concordance of skin test reactivity between indoor inhalant allergens among children with allergic respiratory disease. BMC Pediatr. 2021;21(1):1-7.
14. Yaytokgil SB, Metbulut AP, Giniş T, Toyran M, Civelek E, Misirlioğlu ED. Cat allergy in children and the effect of the COVID-19 pandemic. Allergy Asthma Proc. 2022;43(5):e31-9.
15. Soto-Martínez M, Yock-Corrales A, Camacho-Badilla K, Abdallah S, Duggan N, Avila-Benedictis L, et al. The current prevalence of asthma, allergic rhinitis, and eczema related symptoms in school-aged children in Costa Rica. J Asthma. 2019;56(4):360-8.
16. Sparkes AH. Human allergy to cats: A review of the impact on cat ownership and relinquishment. J Feline Med Surg. 2022;24(1):43-52.
17. Yüksel Aslıer NG, Saatçi Ö, Aslier M. Disease and quality of life aspects of cat allergy in non-pet owners with allergic rhinitis. Int Arch Allergy Immunol. 2023;184(7):625-33.
18. Park Y-B, Mo E-K, Lee J-Y, Kim J-H, Kim C-H, Hyun I-G, et al. Association between pet ownership and the sensitization to pet allergens in adults with various allergic diseases. Allergy Asthma Immunol Res. 2013;5(5):295-300.
19. Lei DK, Grammer LC, editors. An overview of allergens. Allergy Asthma Proc. 2019;40(6):362-5.
20. Popescu F-D. Cross-reactivity between aeroallergens and food allergens. World J Methodol. 2015;5(2):31-50.
21. Čelakovská J, Ettlerova K, Ettler K, Vaněčková J, Bukač J. Sensitization to aeroallergens in atopic dermatitis patients: association with concomitant allergic diseases. J Eur Acad Dermatol Venereol. 2015;29(8):1500-5.

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